Real Time Control Software for Electromagnetic Formation Flight, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

We propose the development of a maintainable and evolvable real-time control software system for Electromagnetic Formation Flight (EMFF). EMFF systems use high-temperature, superconducting electromagnets to control the relative positions and orientations between two or more formation-flying satellites without using expendable, and possibly contaminating propellant. Eventual applications for EMFF range from X-ray astronomy missions, such as XEUS, MAXIM and Gen-X, to extra-solar planetary science, such as Terrestrial Planet Finder-Interferometer, to vehicle inspection systems for long duration exploration missions. The current EMFF control software was developed as a laboratory exercise, and is not scalable or appropriate for use in a flight environment. The proposed software effort will use a model-based development approach, using executable models to define the EMFF control algorithms, command and data handling behaviors and other system behaviors, and an elaboration of the software architecture defined during Phase I in the form of model translation tools, scripts and procedures, to produce flight-qualifiable EMFF avionics software. The developed software products will be extensible and adaptable for future EMFF applications. Initial testing will be on EMFF hardware developed for a related DARPA program and loaned to this effort at no cost to the SBIR program.

Primary U.S. Work Locations and Key Partners

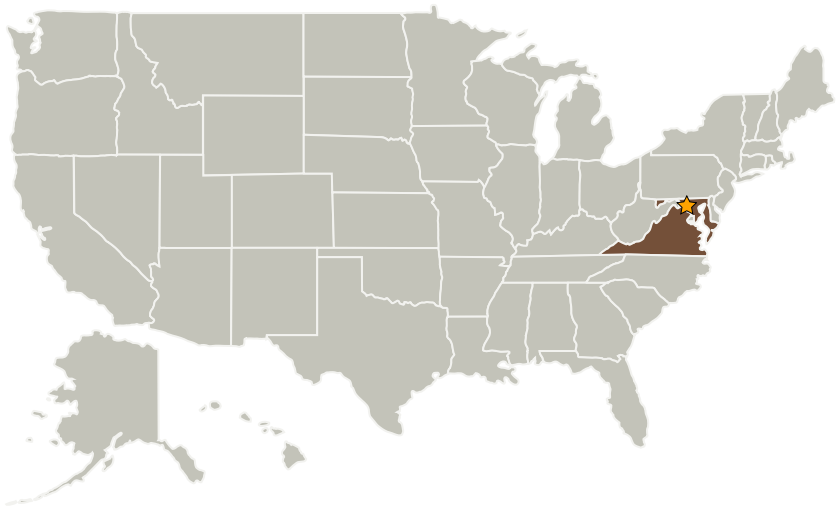

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Aurora Flight Sciences Corporation	Supporting Organization	Industry	Cambridge, Massachusetts

Primary U.S. Work Locations	
Maryland	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.3 Control Technologies
    - TX17.3.1 Onboard Maneuvering / Pointing / Stabilization / Flight Control Algorithms